

International Nuclear Energy Research Initiative

U.S. DEPARTMENT OF ENERGY INTERNATIONAL NUCLEAR ENERGY RESEARCH INITIATIVE United States/Brazil

ABSTRACT

Development of Advanced Instrumentation and Control for an Integrated Primary System Reactor

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Outline of Project

The Generation IV International Forum (GIF) Roadmap study identified a category of reactor concepts that is capable of satisfying many of the Generation IV (Gen IV) program goals, but on a more near-term time schedule. These reactor concepts, designated as International Near Term Deployment (INTD), are based on technologies that are sufficiently mature to allow reactor deployment in the year 2015, as opposed to the year 2030 deployment anticipated for Gen IV concepts. Accordingly, the INTD is considered to be a bridge between today's nuclear technology and that of Gen IV designs.

One of the INTD concepts, the Integral Primary System Reactor (IPSR) has gained considerable political and research interest due to its advantages of improved safety and lower development risk. The application of inherently-safe design features and proven Light-Water Reactor (LWR) technology contribute to the IPSR's advantages. However, the integral and relatively low-power configuration of the IPSR presents several challenges that necessitates research and development activities.

This project will perform a thorough review of the IPSR instrumentation requirements, which are considerably different from its counterpart in a LWR. Research will also be performed in order to develop an accurate in-vessel coolant level measurement, which is a significant instrumentation challenge for the International Reactor Innovative and Secure (IRIS). IRIS is a leading IPSR candidate and the irregular flow path imposed by the shape of the pressurizer bottom plate, riser, control rod drive mechanisms, and other structural components make the use of conventional level measurements almost impossible.
